

1, 2, 6-15, 22, 26, 29 and 31 are directed to allowable subject matter is appreciated.

Canceled Claims

Claims 2 and 14 have been canceled.

Claims Directed to Allowable Subject Matter

Claims 1, 6-15, 22, 26, and 31 have been amended to address the rejections under 35 U.S.C. 112, second paragraph and should now be in condition for allowance.

Claim 1 has been amended to provide antecedent basis for the “actual and desired positions.” Claims 6, 15, and 24 have been amended to provide antecedent basis for “the difference” and “the actual and desired positions.” Claim 15 has also been amended to clarify that claim is not directed to the combination of the tool and guiding apparatus but rather the guiding apparatus. Claim 22 has been amended to provide antecedent basis for “the direction.” Claim 26 has been amended to provide antecedent basis for “the actual position of the tool.” Please note “a desired position” at line 4. Claims 7-14 and 31 were rejected based on their dependency from their respective base claims and should likewise now be in condition for allowance.

Claims Rejected Under 35 U.S.C. 103

Claims 3-5, 17, 19-21, 23, 24, 25, 27-29, 30 and 35 stand rejected under 35 U.S.C. 103 as obvious over Manwaring in view of Yabe.

Turning first to claims 24, 27, and 30, the office action notes that these claims add another display remote from the tool and that this limitation is encompassed by the previous rejection. The office action states that Manwaring includes a display remote from the tool (i.e. the endoscope). By including a monitor on the tool as set forth in Yabe, the actual and desired position of the tool may be displayed on both displays for the convenience of the surgeon.

Claim 24 has been amended to require that the indicator provide a rotationally invariant

indication of the difference between the actual and desired positions of the tool. With reference to page 10, lines 7-21 of the present application as filed, the difference between the actual and desired positions of the tool is displayed correctly irrespective of the orientation of the tool.

In contrast, neither Manwaring nor Yabe disclose or suggest such a property. Manwaring's graphic object 46 is displayed in a predetermined orientation on the display. Assuming, arguendo, that the graphic object 46 was mounted on the tool 12, there is no teaching or suggesting that position difference information be displayed in rotationally invariant fashion. This may be better understood by way of an example where Manwaring's display 40 is assumed to be mounted to the tool 12. With reference to Manwaring col. 9:29-48, col. 9:26-42, and Figures 2 and 8, the information displayed on the graphics object 46 will be displayed in the same orientation relative to the display indicator 40 irrespective of the rotational position of the tool.

In the example depicted in Manwaring's Figure 8, the probe is off trajectory with the probe tip point 36' "below and to the left" of trajectory point 54. See col. 9:34-37. This, however, is "below and to the left" relative to the display, not the tool. Thus, if the tool is rotated for example about its axis clockwise by 90 degrees, the trajectory information is still displayed in the same position relative to the display. Assuming that the initial rotational position was correctly depicted "below and to the left" in relation to original position of the tool, the surgeon must mentally "unrotate" the graphics object to relate it to the desired motion of the tool. While Manwaring discloses a roll feature 118 with a pointer 120, its purpose is to indicate "which way is up" on the video image. See col. 9:55-62. The surgeon must still mentally unrotate graphics object 46.

In contrast, the rotational invariance of the present invention displays position difference information correctly as the tool as rotated. For example, as shown in Figure 4 of the present invention (and discussed in the accompanying text), the appropriate LED's are illuminated in sequence to show that the tool must be moved "up and to the right" irrespective of the rotation of the tool. Such rotational invariance may be applied to other embodiments of position indicators,

such as Manwaring's graphics object 46, though such application is neither disclosed nor suggested by the prior art of record.

Analogously, **claims 27 and 30** each require that the indication in which the tool should be moved to reach the desired position is provided in relation to the indicator reference frame. Thus, as described above in relation to Claim 24, the present invention takes advantage of the known relationship between the tool-mounted position indicator and the tool so that the desired motion of the tool can be displayed correctly and intuitively as the tool is moved in relation to the patient. As also described above in connection with claim 24, Manwaring's graphics object 46 is provided without taking the position of the indicator into account.

Turning now to claims 3, 17, and 25, the office action states that applicant's previous amendment merely amends the preambles to include the intended use of the apparatus which fails to further limit the apparatus.

First, **claim 17** has been amended in a manner analogous to claim 24 to require that the indicator provide a rotationally invariant indication of the direction in which the tool should be moved to reach the desired position.

In addition, **claims 3 and 25** have been amended to require that, in operation, the difference between the actual and desired positions of the tool be displayed on the tool mounted means for indicating/indicator whereas the actual position of the tool in relation to the anatomy of the patient is displayed on the remote display. In contrast, Manwaring teaches that both pieces of information are displayed on the main display 40. It submitted that selecting a portion of Manwaring's display (e.g., graphics object 46) for display on the present tool mounted indicator while selecting another portion of that display (e.g., tomographic image 42) would be an improper "picking and choosing" of elements to arrive at the claimed invention based on hindsight.

Moreover, the apparatus of claims 3 and 25 provides substantial and unexpected advantages over Manwaring. By displaying only difference information on the tool mounted

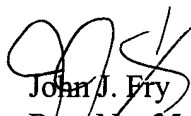
indicator, the display mounted thereon can be relatively smaller than the remote display, thereby rendering the surgical tool relatively smaller and easier to use. Conversely, the main display can remain relatively larger so that more detailed information as shown in the tomographic images can be more easily seen, again without compromising the image quality or the size of the tool.

For at least the foregoing reasons, together with their dependencies from their respective base claims, it is submitted that dependent claims 4, 5, 19-21, 23, 28, 29, and 33-35 likewise distinguish potentially and non-obviously over the prior art of record.

Conclusion

It is submitted that claims 1, 3-13, 17, 19-31, and 33-35 distinguish patentably and non-obviously over the prior art of record. An early indication of allowability is earnestly solicited.

Respectfully submitted,



John J. Fry
Reg. No. 35,873
Marconi Medical Systems, Inc.
595 Miner Road
Cleveland, OH 44143
440 483 3455